letters to the editor

NETWORK CONVENTIONS

Dear Sir—It seems strange that the 'seven years' hard discussion' by the IEC on network conventions reported by Prof. M.G. Say (Oct. 1969 *E & P*, p. 355) has yielded a recommended convention for current that is fallacious in principle and useless in practice. The familiar double-subscript notation for voltage appropriately specifies the nodes between which the voltage exists. Since current is the dual of voltage, the corresponding notation for current must specify the meshes between which the current exists. This point seems elementary and obvious. Moreover, its structural analogue has been well known for nearly 100 years under the name of Bow's notation. And even the mesh notation for currents had been published in a number of places long before the IEC began its arduous seven years.

To propose a node-based notation for current is clearly a blunder which meets its just retribution directly one attempts to apply it to networks having more than one branch between a pair of nodes. Some fumbling device has then to be improvised to distinguish the currents. So we cannot be surprised that textbook authors who introduce this notation quietly drop it themselves before very long!

In the same article, the potential-fall notation is admitted to be anomalous, in that it gives rise to two oppositely directed arrows between the same pair of nodes. This anomaly is not only the root of a vast amount of confusion among students (and others?) but precludes any system of phasor diagrams that can be helpfully applied to complicated circuits. The only objection raised—that the power has to be taken as positive input for a component for which the voltage and current arrows oppose—does not arise if Ohm's law is stated in terms of the voltage *applied*.

In the existing absence of any universal criterion for distinguishing between e.m.f.s and other voltages, the only safe (as well as the simplest) form of Kirchhoff's mesh law is $\Sigma e = 0$, and this agrees with the simple experimental fact that only one voltage can be validly found between any two points.—Yours faithfully,

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